

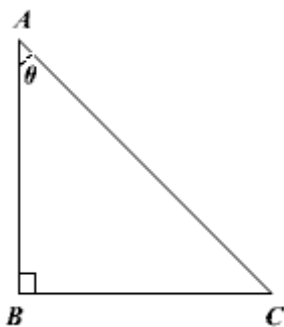
Do NOT write on this exam.
Remember your test-taking strategies.
Good luck!

ALGEBRA 2 FINAL EXAM

Multiple Choice

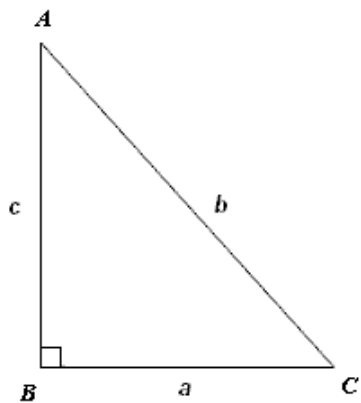
Identify the letter of the choice that best completes the statement or answers the question.

1. Dione Industries bought a scanner for \$800. It is expected to depreciate (decrease in value) at a rate of 10% per year. What will the value of the scanner be in 2 years?
 - a. \$648
 - b. \$720
 - c. \$889
 - d. \$968
2. Find the values of the six trigonometric functions for angle θ , when $AC = 10$ and $BC = 8$.



- a. $\sin \theta = \frac{5}{3}$, $\cos \theta = \frac{5}{4}$, $\csc \theta = \frac{3}{5}$, $\sec \theta = \frac{4}{5}$, $\tan \theta = \frac{3}{4}$, and $\cot \theta = \frac{4}{3}$.
- b. $\sin \theta = \frac{4}{5}$, $\cos \theta = \frac{3}{5}$, $\csc \theta = \frac{5}{3}$, $\sec \theta = \frac{5}{4}$, $\tan \theta = \frac{4}{3}$, and $\cot \theta = \frac{4}{3}$.
- c. $\sin \theta = \frac{5}{3}$, $\cos \theta = \frac{3}{4}$, $\csc \theta = \frac{3}{5}$, $\sec \theta = \frac{4}{5}$, $\tan \theta = \frac{4}{3}$, and $\cot \theta = \frac{5}{4}$.
- d. $\sin \theta = \frac{4}{5}$, $\cos \theta = \frac{3}{5}$, $\csc \theta = \frac{5}{4}$, $\sec \theta = \frac{5}{3}$, $\tan \theta = \frac{4}{3}$, and $\cot \theta = \frac{3}{4}$.

3. Solve $\triangle ABC$ by using the measurements $\angle ABC = 90^\circ$, $\angle BAC = 35^\circ$, and $a = 10$. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.



- a. $\angle C = 55^\circ, c \approx 17.0, b \approx 14.0$
 b. $\angle C = 55^\circ, c \approx 14.0, b \approx 17.0$
 c. $\angle C = 55^\circ, c \approx 14.0, b \approx 12$
 d. $\angle C = 55^\circ, c \approx 7, b \approx 9$
4. A 15-m long ladder rests against a wall at an angle of 60° with the ground. How far is the foot of the ladder from the wall?
- a. 7.5 m
 b. 12.9 m
 c. 17.3 m
 d. 30 m

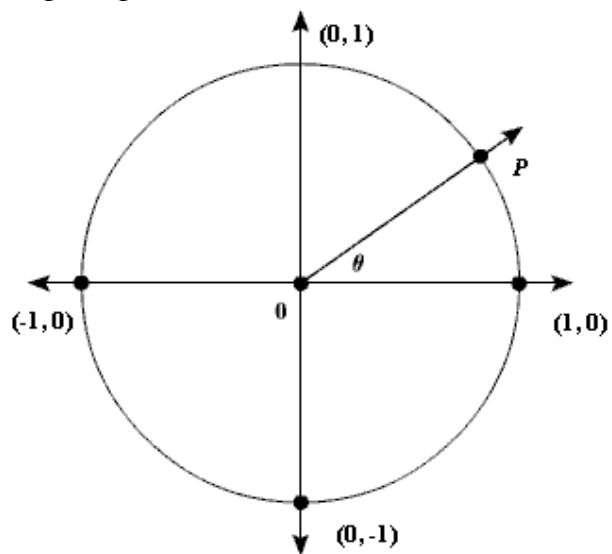
Rewrite the radian measure in degrees.

5. $\frac{\pi}{18}$
 a. 5°
 b. $10\pi^\circ$
 c. 100°
 d. 10°
6. $\frac{3\pi}{12}$
 a. 450°
 b. 7.5°
 c. 45°
 d. $45\pi^\circ$

Rewrite the degree measure in radians.

7. 9°
 a. $\frac{20}{\pi}$
 b. 3600π
 c. $\frac{\pi}{20}$
 d. 1146.5π

The given point P is located on the unit circle. Find $\sin \theta$ and $\cos \theta$.



8. $P(0.8, 0.6)$

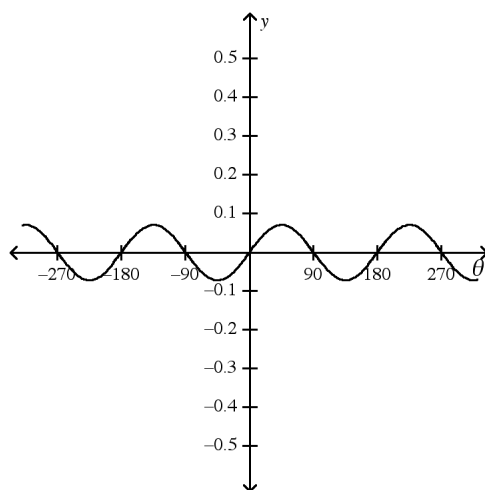
- a. $\sin \theta = 0.6$; $\cos \theta = 0.8$
- b. $\sin \theta = 0.8$; $\cos \theta = 0.6$

- c. $\sin \theta = -0.6$; $\cos \theta = -0.8$
- d. $\sin \theta = -0.8$; $\cos \theta = -0.6$

Find the amplitude, if it exists, and period of the function. Then, graph the function.

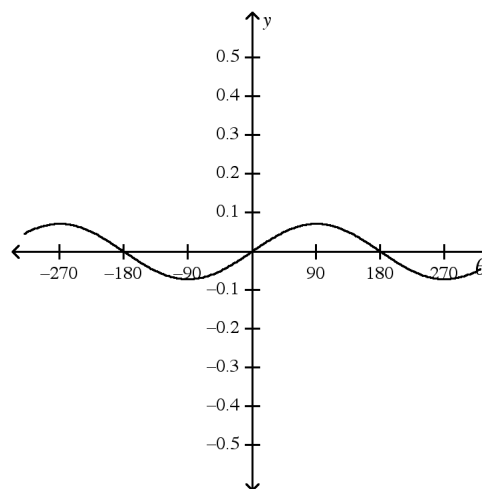
9. $y = \frac{1}{14} \sin \theta$

a.



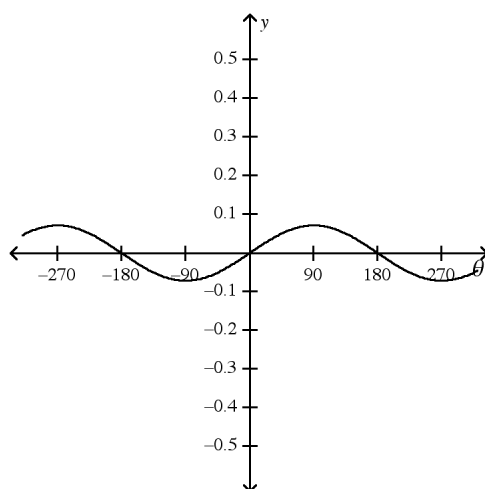
amplitude: $\frac{1}{14}$; period: 180

c.



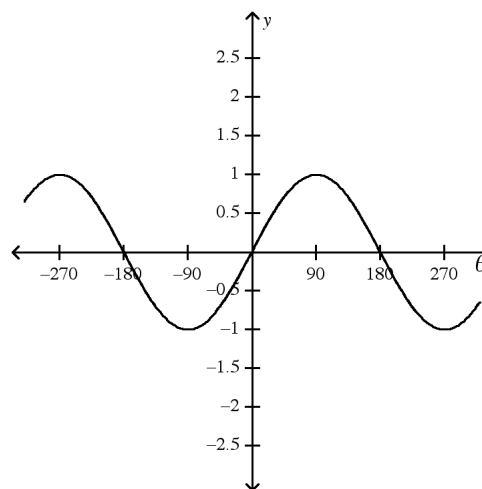
amplitude: $\frac{1}{14}$; period: 360

b.



amplitude: does not exist; period: 180

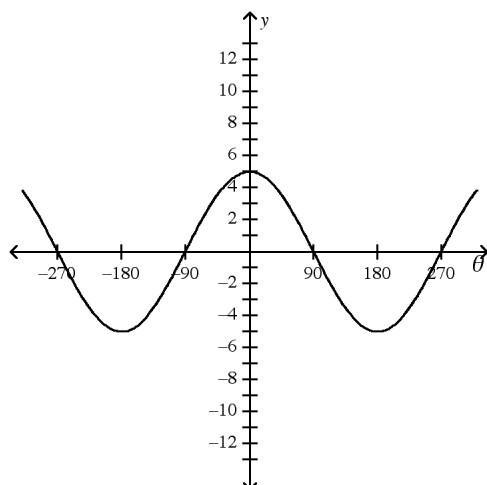
d.



amplitude: $\frac{1}{14}$; period: 360

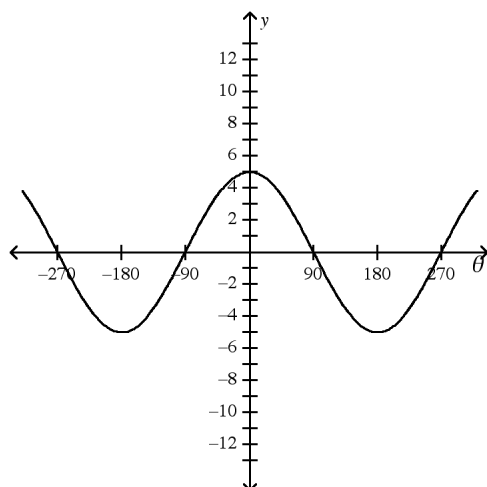
10. $y = 5 \cos \theta$

a.



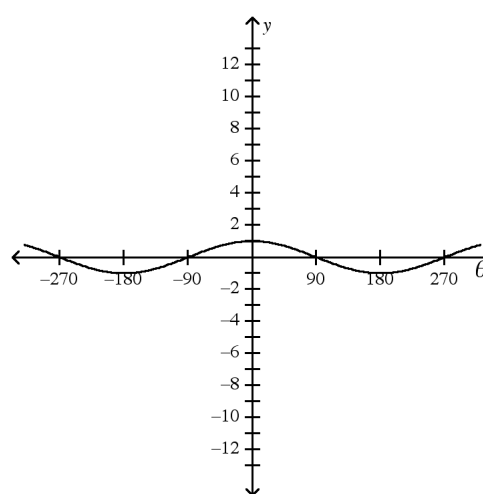
amplitude: 5; period: 360

b.



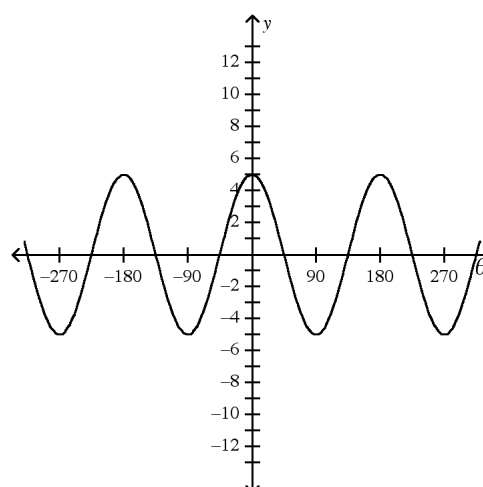
amplitude: does not exist; period: 180

c.



amplitude: 1; period: 360

d.

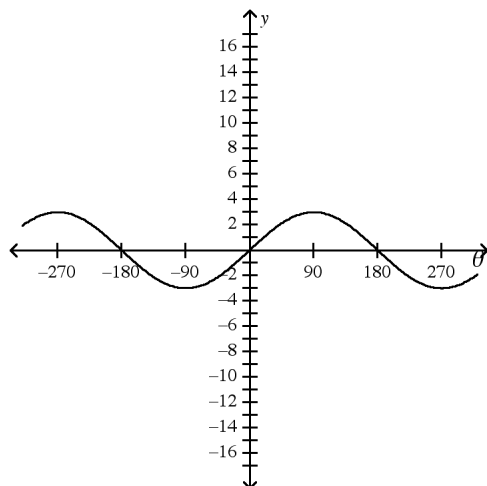


amplitude: 5; period: 180

State the amplitude, period, and phase shift for the function. Then, graph the function.

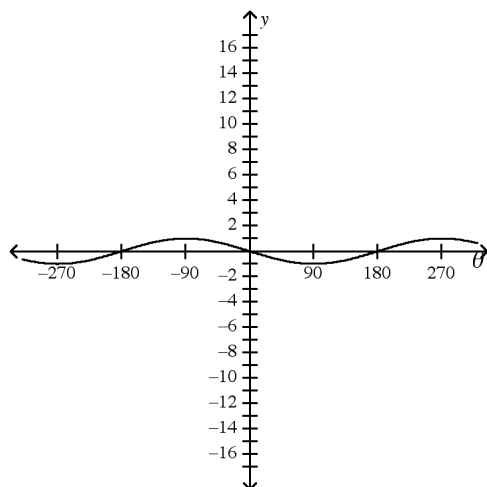
11. $y = 3 \cos (\theta - 90^\circ)$

a.



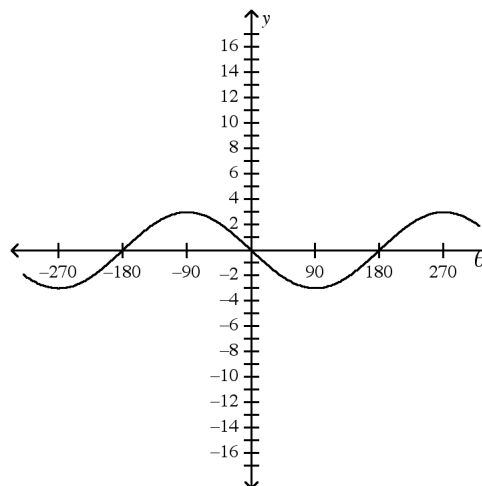
amplitude = 3; period = 360° ;
phase shift = 90°

b.



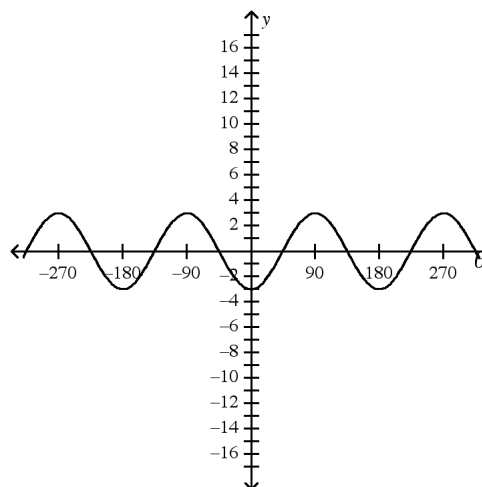
amplitude = 1; period = 360° ;
phase shift = 90°

c.



amplitude = 3; period = 90° ;
phase shift = 360°

d.



amplitude = 3; period = 180° ;
phase shift = 90°

12. Consider the quadratic function $f(x) = -2x^2 + 5x + 2$. Find the y-intercept and the equation of the axis of symmetry.

a. The y-intercept is -2 .

The equation of axis of symmetry is $x = -\frac{5}{4}$.

b. The y-intercept is $+2$.

The equation of axis of symmetry is $x = \frac{5}{4}$.

c. The y-intercept is $\frac{5}{4}$.

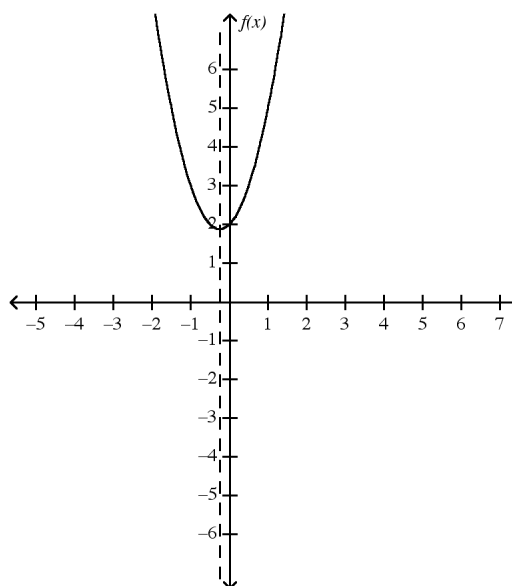
The equation of axis of symmetry is $x = +2$.

d. The y-intercept is $-\frac{5}{4}$.

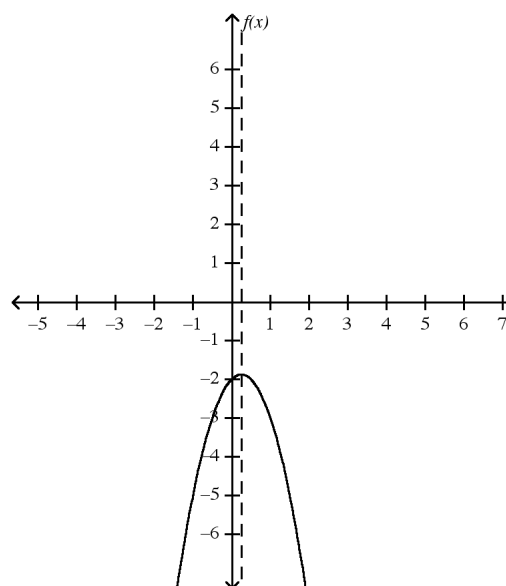
The equation of axis of symmetry is $x = -2$.

13. Graph the quadratic function $f(x) = -2x^2 - x - 2$.

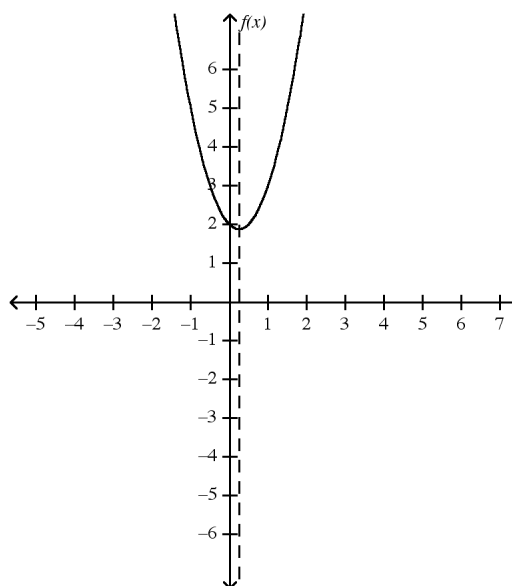
a.



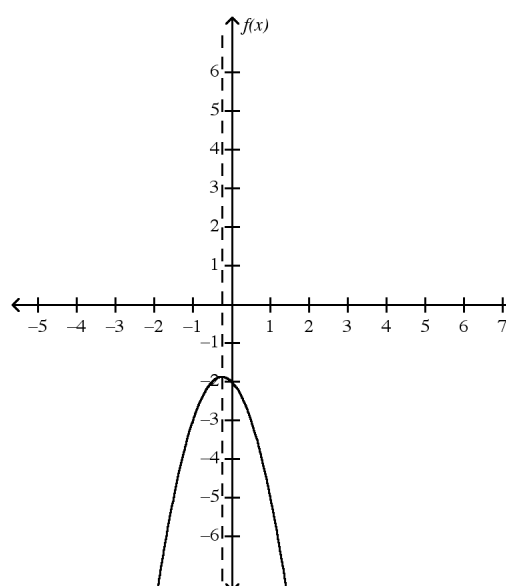
c.



b.



d.



Determine whether the given function has a maximum or a minimum value. Then, find the maximum or minimum value of the function.

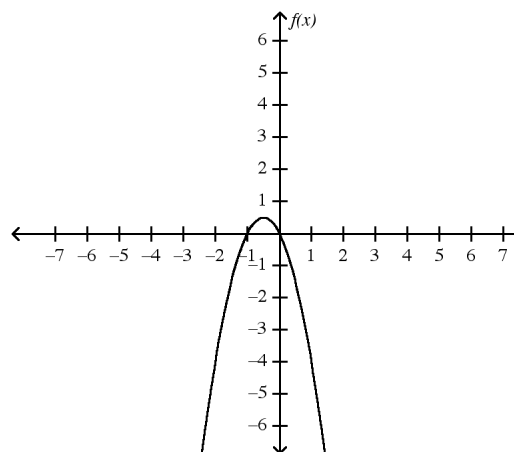
14. $f(x) = 2x^2 - 6x + 6$

- The function has a minimum value. The minimum value of the function is 19.5.
- The function has a maximum value. The maximum value of the function is 1.5.
- The function has a minimum value. The minimum value of the function is 1.5.
- The function has a maximum value. The maximum value of the function is 19.5.

Solve the equation by graphing.

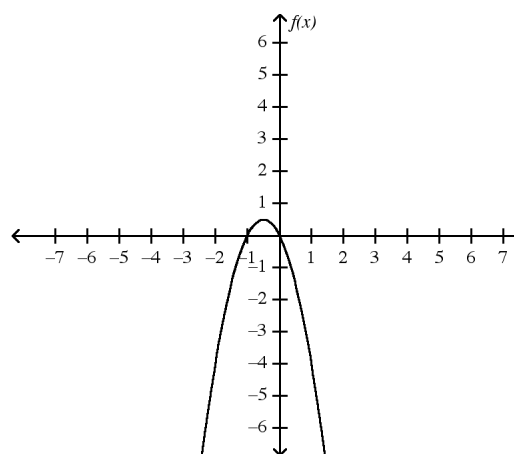
15. $-2x^2 - 2x = 0$

a.



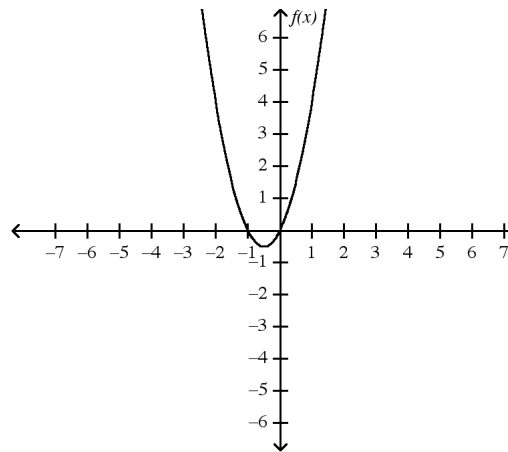
The solution set is $\{-1, 0\}$.

b.



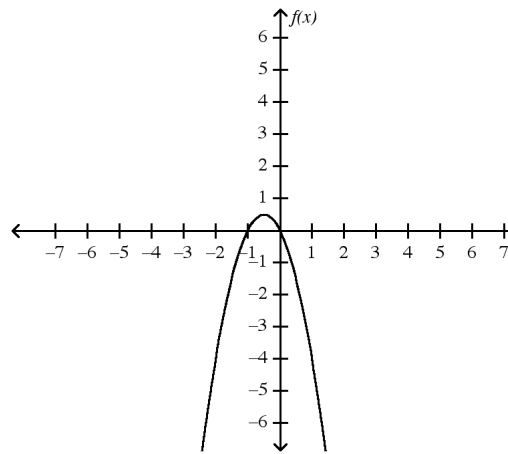
The solution set is $\{-0.5, 0.5\}$.

c.



The solution set is $\{0, 1\}$.

d.



The solution set is $\{0, 1\}$.

Solve the equation by factoring.

16. $x^2 + 8x - 48 = 0$

a. $\{-4, -12\}$

b. $\{4, 12\}$

c. $\{-12, 4\}$

d. $\{-4, 12\}$

Find the exact solution of the following quadratic equation by using the Quadratic Formula.

17. $-x^2 + 7x + 11 = 0$

a. $\left\{ \frac{-7 - \sqrt{56}}{-2}, \frac{-7 + \sqrt{56}}{-2} \right\}$

b. $\left\{ \frac{-7 - \sqrt{5}}{-2}, \frac{-7 + \sqrt{5}}{-2} \right\}$

c. $\left\{ \frac{-7 - \sqrt{93}}{-2}, \frac{-7 + \sqrt{93}}{-2} \right\}$

d. $\left\{ \frac{7 - \sqrt{93}}{-2}, \frac{7 + \sqrt{93}}{-2} \right\}$

Find the coordinates of the vertex of the quadratic function.

18. $y = -5x^2 + 20x - 13$

a. $(2, 7)$

b. $(7, 2)$

c. $(-7, -2)$

d. $(-2, -7)$

19. $y = 5x^2 - 11$

a. $(0, -11)$

b. $(0, 11)$

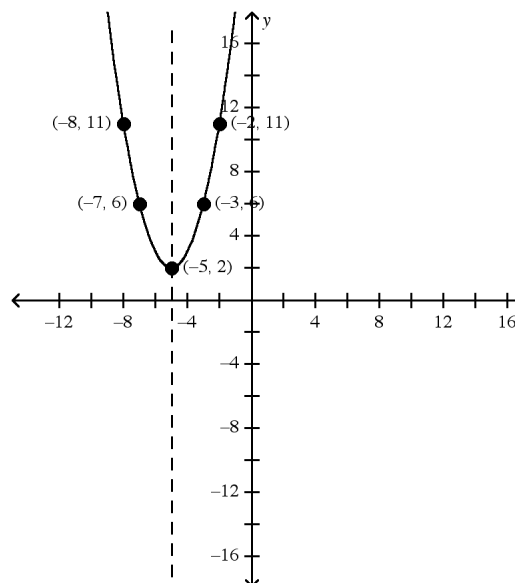
c. $(-11, 0)$

d. $(11, 0)$

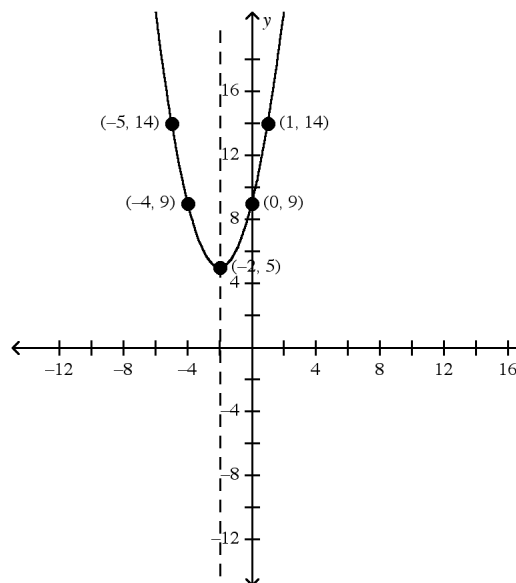
Graph the quadratic equation or inequality.

20. $y = (x - 2)^2 - 5$

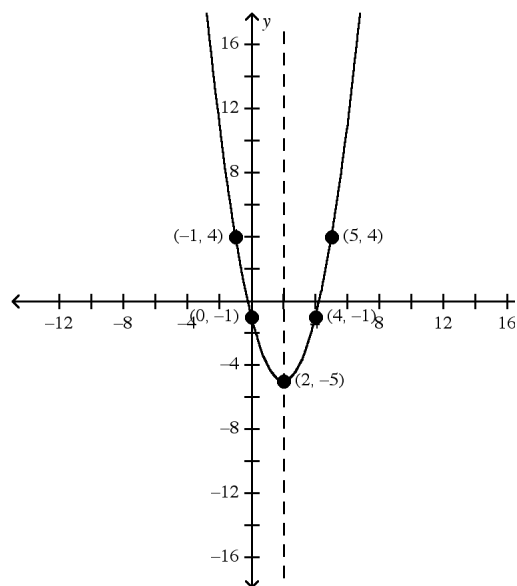
a.



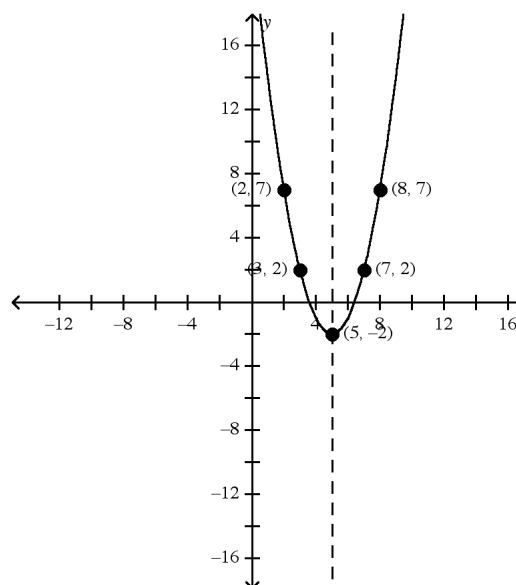
c.



b.



d.



Simplify the given expression. Assume that no variable equals 0.

21. $\left(\frac{8x^6y^6}{4x^3y^{12}} \right)^2$

a. $2x^3y^{12}$

b. $\frac{4x^3}{y^6}$

c. $4x^6y^{-12}$

d. $\frac{4x^6}{y^{12}}$

Factor the polynomial completely.

22. $11x^4y - 22x^2y^2$

a. $11(x^4y - 2x^2y^2)$

b. $x^2y(11x^2 - 22y)$

c. $11x^2y(x^2 - 2y)$

d. $11x^2(x^2y - 2y^2)$

23. $10a^4b^2 - 15a^3b^2$

a. $a^3b^2(10a - 15)$

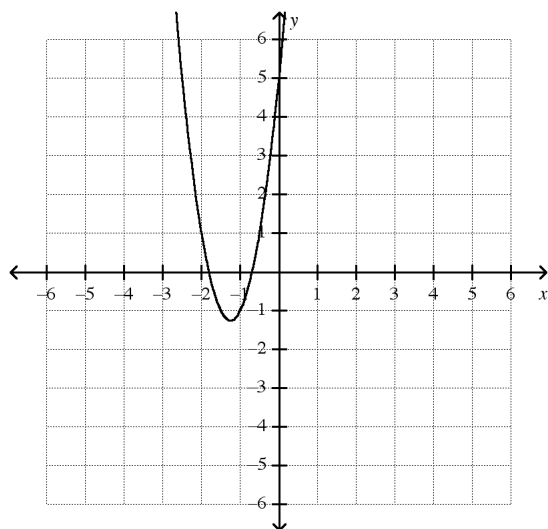
b. $5(2a^4b^2 - 3a^3b^2)$

c. $5a^2b^2(2a^2 - 3)$

d. $5a^3b^2(2a - 3)$

Identify the type of function represented by the graph.

24.



a. absolute value function

b. inverse variation function

c. quadratic function

d. rational function

Identify the type of function represented by the equation.

25. $y = |8x|$

- a. absolute value function
b. identity function

- c. constant function
d. direct variation function

26. $y = x^2 + 5x + 6$

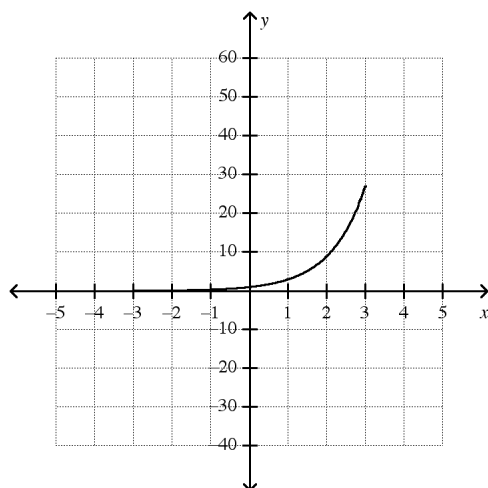
- a. quadratic function
b. identity function

- c. rational function
d. absolute value function

Sketch the graph of the given function. Then state the function's domain and range.

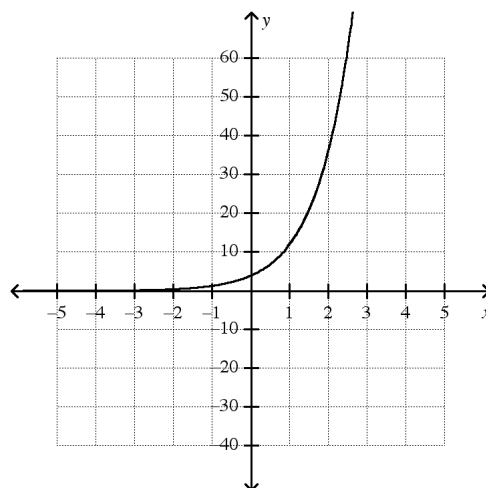
27. $y = 4(3)^x$

a.



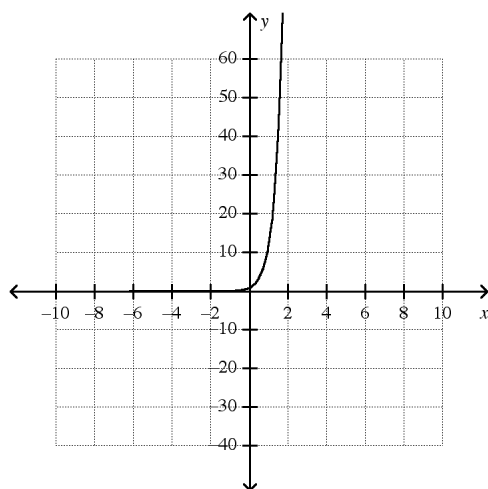
The domain is all real numbers and the range is all positive numbers.

c.



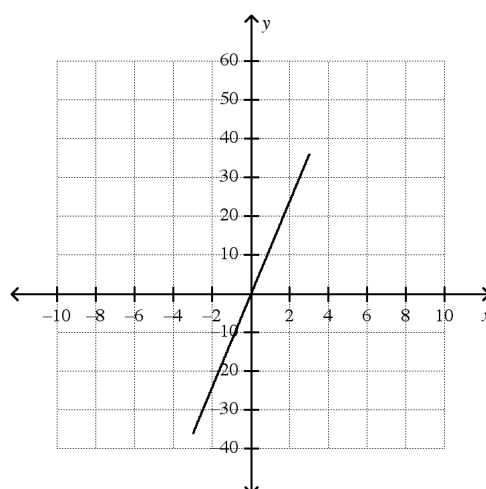
The domain is all real numbers and the range is all positive numbers.

b.



The domain is all real numbers and the range is all positive numbers.

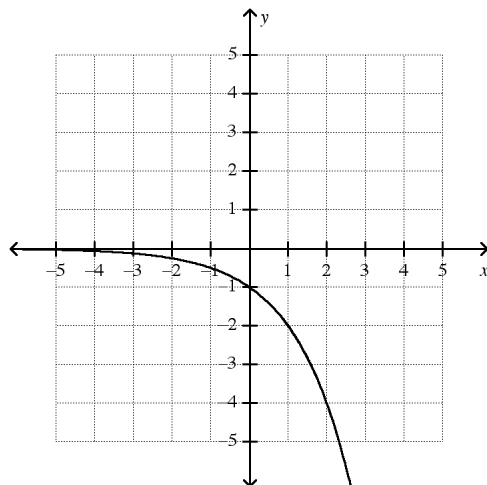
d.



The domain is all real numbers and the range is all real numbers.

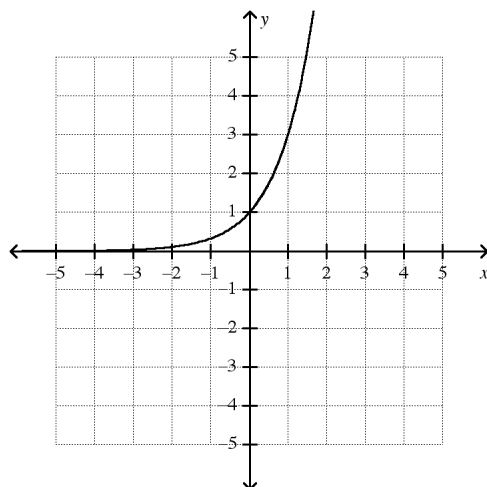
28. $y = -1.5(2)^x$

a.



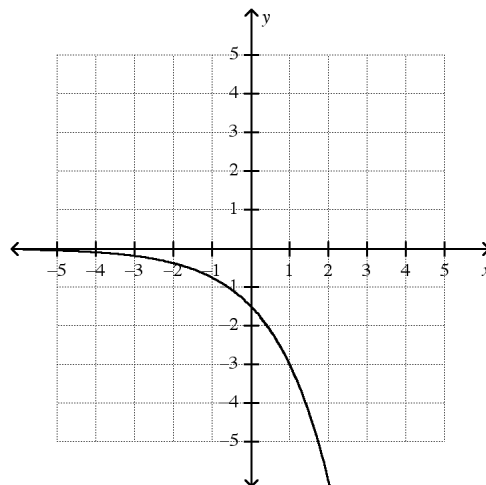
The domain is all real numbers and the range is all negative numbers.

b.



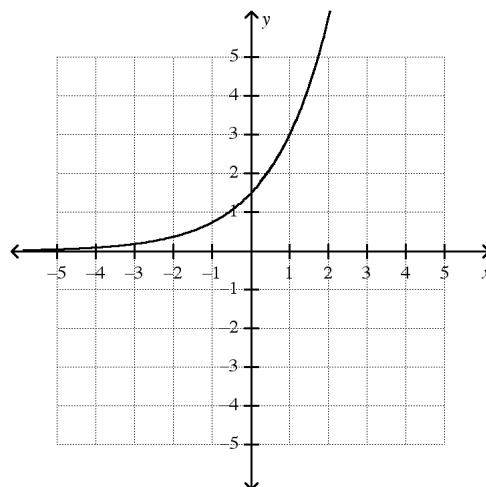
The domain is all real numbers and the range is all positive numbers.

c.



The domain is all real numbers and the range is all negative numbers.

d.



The domain is all real numbers and the range is all positive numbers.

29. The Smiths bought an apartment for \$75,000. Assuming that the value of the apartment will appreciate (increase) at most 4% a year, how much will the apartment be worth in 3 years?

a. \$66,347

c. \$84,365

b. \$75,916

d. \$85,858

Simplify the following expressions.

30. $(x+3)(x-5)$

a. $x^2 - 2x + 15$

b. $x^2 - 2x - 15$

c. $x^2 + 2x - 15$

d. $x^2 - 2x - 2$

31. $(2x+7)(x+4)$

a. $2x^2 + 15x + 28$

b. $x^2 + 15x + 28$

c. $2x^2 + 11x + 28$

d. $x^2 + 11x + 28$

32. $(2x-3)(3x-6)$

- a. $5x^2 - 21x + 18$ b. $6x^2 - 3x - 18$ c. $6x^2 - 21x + 18$ d. $5x^2 - 3x - 9$

Factor the following.

33. $y = x^2 + 6x + 8$

- a. $(x+8)(x+1)$ b. $(x-4)(x-2)$ c. $(x+3)(x+2)$ d. $(x+4)(x+2)$

34. $y = 2x^2 - 7x + 5$

- a. $(2x-5)(x-1)$ b. $(x-5)(x-1)$ c. $(2x+5)(x+1)$ d. $(x+5)(x+1)$

Choose the type of function that best models each situation.

35. A population of bacteria that doubles every 70 minutes.

- a. linear b. quadratic c. exponential d. trigonometric

36. An object flying through the air (projectile motion).

- a. linear b. quadratic c. exponential d. trigonometric

37. A banquet hall charges a \$300 flat fee plus \$20 per person.

- a. linear b. quadratic c. exponential d. trigonometric

38. The height of a passenger on a ferris wheel over time.

- a. linear b. quadratic c. exponential d. trigonometric

39. Find the axis of symmetry of $y = -3x^2 + 12x - 8$

- a. $x = \frac{1}{8}$ b. $x = 2$ c. $x = 4$ d. $x = -2$

Find the solutions of the quadratic function using the method of your choice.

40. $y = 3x^2 + 7x - 2$

- a. $x = 0.257, -2.59$ b. $x = -0.257, 2.59$ c. $x = -\frac{1}{3}, -2$ d. $x = \frac{1}{3}, 2$

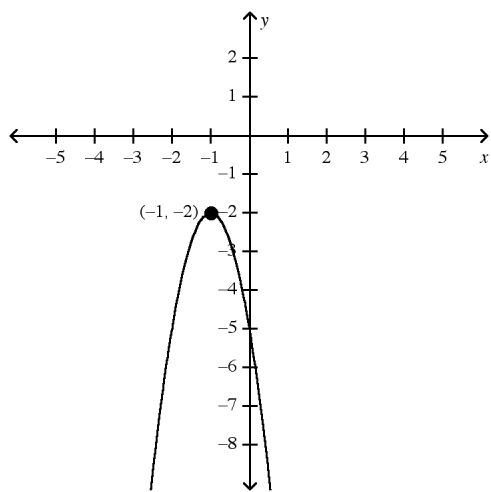
41. $y = x^2 + 7x + 12$

- a. $x = 4, 3$ b. $x = 2, 6$ c. $x = -4, -3$ d. $x = -2, -6$

Choose the transformation of the parent function that is NOT true according to the equation.

42. $y = -5x^2 + 8$
 a. Opens down b. Skinnier c. Shifted up 8 units d. Shifted right 8 units
43. $y = \frac{2}{3}(x - 2)^2 - 4$
 a. Wider parabola b. Shifted down 4 units c. Shifted left 2 units d. Shifted right 2 units
44. $y = 3\sin(x - 20) + 2$
 a. larger amplitude b. shifted 20 degrees to right c. shorter period d. shifted 2 units up
45. $y = -\frac{1}{2}\cos[2(x - 45)]$
 a. Smaller amplitude b. Graph is at minimum when $x=0$ c. Shorter period d. Graph shifted 45 degrees left
46. $y = 4(x - 3)^2 - 1$
 a. Skinnier parabola b. Wider parabola c. x-value of vertex moved to 3 d. y-value of vertex moved to -1

Give the equation of the parabola that fits the given information.

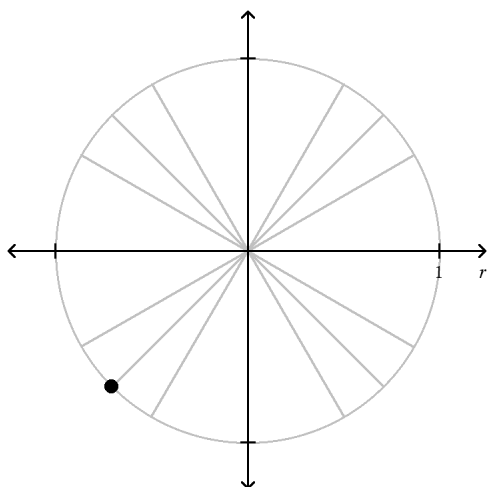


47.
 a. $y = \frac{1}{3}(x + 1)^2 - 2$ b. $y = 3(x + 1)^2 - 2$ c. $y = -\frac{1}{3}(x - 1)^2 - 2$ d. $y = -3(x + 1)^2 - 2$

48. A parabola that is wider than $y = x^2$, opens up, and is shifted up 3 units.

- a. $y = 5x^2 + 3$ b. $y = -\frac{1}{3}x^2 - 3$ c. $y = \frac{1}{4}x^2 + 3$ d. $y = -2x^2 - 3$

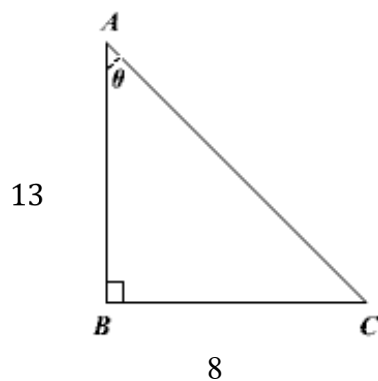
Label the point on the unit circle in radians and degrees.



49.

- a. $210^\circ, \frac{5\pi}{4}$ b. $210^\circ, \frac{7\pi}{6}$ c. $225^\circ, \frac{7\pi}{6}$ d. $225^\circ, \frac{5\pi}{4}$

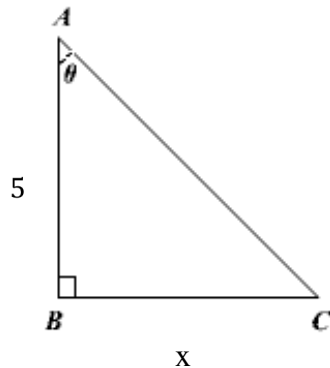
Find the missing side length using the Pythagorean Theorem.



50.

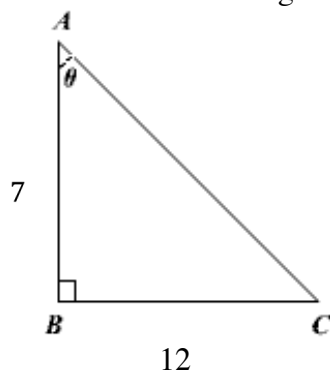
- a. 15.26 b. 233 c. 105 d. 10.25

51.



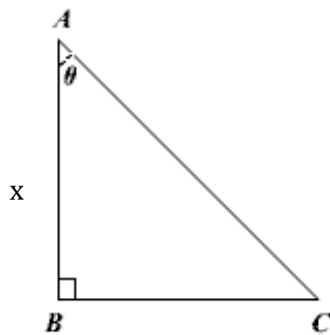
- a. 169 b. 10.91 c. 13 d. 119

52.

Find the measure of angle θ .

- a. $\theta = 59.74^\circ$ b. $\theta = 30.26^\circ$ c. $\theta = 54.31^\circ$ d. $\theta = 35.69^\circ$

53. If $\theta = 40^\circ$ and the hypotenuse is 17 ($\overline{AC} = 17$), find the measure of x .

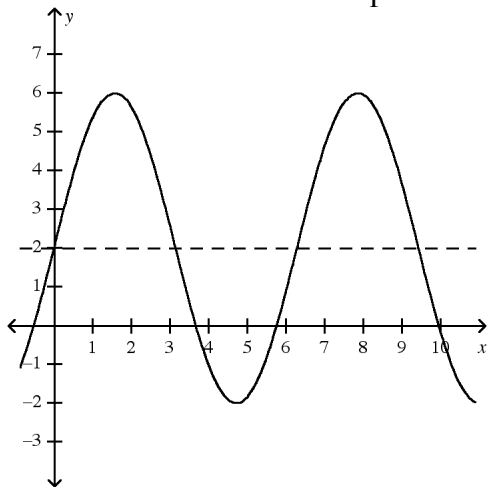


- a. $x = 10.93^\circ$ b. $x = 14.26^\circ$ c. $x = 13.02^\circ$ d. $x = 22.19^\circ$

54. If one acute angle of a right triangle measures 23° , what is the measure of the other acute angle?
- a. 157° b. 67° c. 63° d. 90°

55.

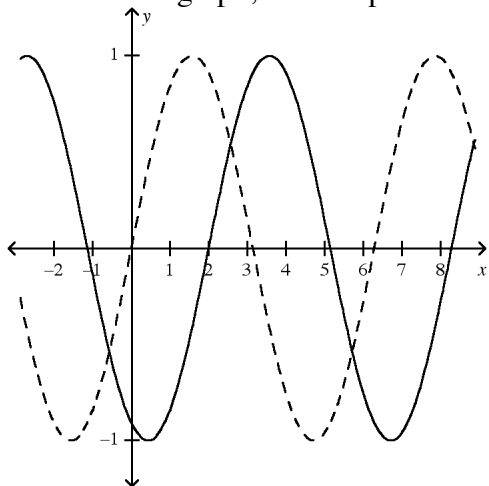
Find the vertical shift and amplitude of the given function.



- a. vertical shift=2
amplitude=6 b. vertical shift=6
amplitude=2 c. vertical shift=2
amplitude=4 d. vertical shift=6
amplitude=4
56. Find the period of the function $y = 3 \sin \frac{1}{2}x$.
- a. 720° b. 120° c. 360° d. 180°

57.

Based on the graph, find the phase shift.



- a. 5 b. -1 c. 3 d. 2

Find x.

58. $5^{2x+3} = 5^{-x+1}$

a. $x = -\frac{3}{2}$

b. $x = -2$

c. $x = -\frac{2}{3}$

d. $x = 2$

59. $3^{2x-1} = 27$

a. $x = 14$

b. $x = 1.5$

c. $x = 1$

d. $x = 2$

60. $9^{x+7} = 1$

a. $x = -6$

b. $x = -7$

c. $x = 7$

d. $x = 2$

Write the exponential function that fits the given information.

61. A pet store has 12 gerbils, which triple in population every 4 months.

a. $y = 12(4)^x$

b. $y = 12(3)^x$

c. $y = 12(3)^4$

d. $y = 3(4)^x$

62. You have \$600 in a bank account and you spend 30% of the money every month.

a. $y = 600(0.3)^x$

b. $y = 600(-30)^x$

c. $y = 600(0.7)^x$

d. $y = 600(1.3)^x$

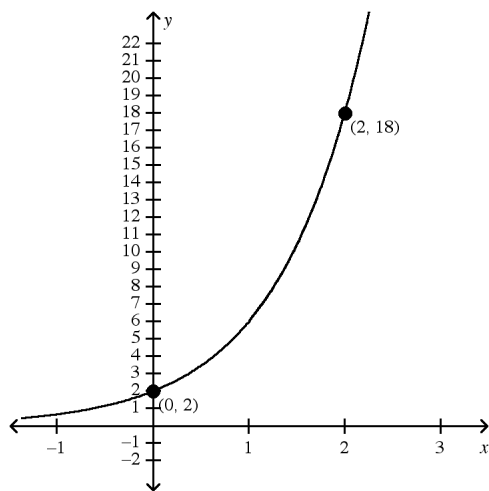
63. Graph goes through the points (0,6) and (1,24)

a. $y = 6(2)^x$

b. $y = 6(24)^x$

c. $y = 4(2)^x$

d. $y = 6(4)^x$



64.

a. $y = 2(3)^x$

b. $y = 2(2)^x$

c. $y = 3(2)^x$

d. $y = 2(9)^x$

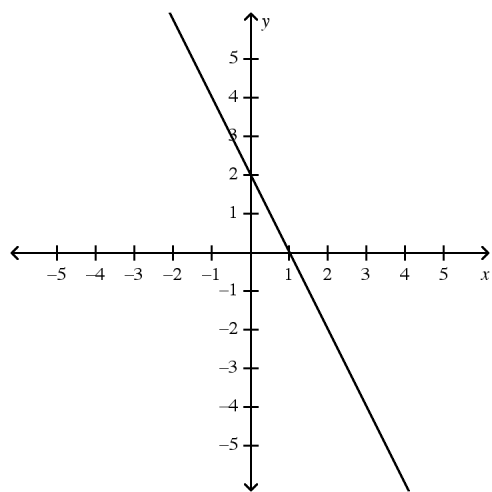
Identify the following as exponential growth, exponential decay or neither.

65. $y = \frac{1}{6}(7)^x$

- a. Exponential Growth b. Exponential Decay c. Neither

66. $y = 8(0.5)^x$

- a. Exponential Growth b. Exponential Decay c. Neither



67.

- a. Exponential Growth b. Exponential Decay c. Neither

68.

x	y
-1	2
0	6
1	18
2	54

- a. Exponential Growth b. Exponential Decay c. Neither

ALGEBRA 2 FINAL EXAM

Answer Section

MULTIPLE CHOICE

- | | |
|------------|---|
| 1. ANS: A | STO: MI I.2.5, MI I.2.6, MI IV.2.5, MI IV.3.2 |
| 2. ANS: D | STO: MI I.2.5, MI I.2.6, MI II.1.1, MI II.1.2, MI II.1.7 |
| 3. ANS: B | STO: MI I.2.6, MI II.1.1, MI II.1.7, MI II.3.1, MI II.3.3 |
| 4. ANS: A | STO: MI I.2.5, MI II.1.2, MI II.3.1, MI II.3.3, MI IV.3.2 |
| 5. ANS: D | STO: MI I.2.5, MI I.2.6, MI II.1.1, MI II.1.7, MI II.3.6 |
| 6. ANS: C | STO: MI I.2.5, MI I.2.6, MI II.1.1, MI II.1.7, MI II.3.6 |
| 7. ANS: C | STO: MI I.2.5, MI I.2.6, MI II.1.1, MI II.3.1, MI II.3.6 |
| 8. ANS: A | STO: MI I.2.5, MI I.2.6, MI II.1.1, MI II.1.7, MI II.3.1 |
| 9. ANS: C | STO: MI I.1.2, MI I.1.3, MI V.2.2 |
| 10. ANS: A | STO: MI I.1.2, MI I.1.3, MI V.2.2 |
| 11. ANS: A | STO: MI I.1.2, MI I.1.3, MI V.2.2 |
| 12. ANS: B | STO: MI I.2.2, MI II.2.2, MI II.2.5, MI II.3.4, MI II.3.5 |
| 13. ANS: D | STO: MI I.2.2, MI II.2.2, MI II.2.5, MI II.3.4, MI II.3.5 |
| 14. ANS: C | STO: MI I.2.2, MI II.2.2, MI II.2.5, MI II.3.4, MI II.3.5 |
| 15. ANS: A | |
| 16. ANS: C | STO: MI I.2.2 |
| 17. ANS: C | |
| 18. ANS: A | STO: MI I.2.2, MI II.3.4, MI II.3.5, MI III.1.1, MI III.1.4 |
| 19. ANS: A | STO: MI I.2.2, MI II.3.4, MI II.3.5, MI III.1.1, MI III.1.4 |
| 20. ANS: B | STO: MI I.2.2, MI II.3.4, MI II.3.5, MI III.1.1, MI III.1.4 |
| 21. ANS: D | |
| 22. ANS: C | STO: MI IV.3.3 |
| 23. ANS: D | STO: MI IV.3.3 |
| 24. ANS: C | |
| 25. ANS: A | |
| 26. ANS: A | |
| 27. ANS: C | STO: MI I.2.2, MI I.2.5, MI I.2.6, MI IV.2.5 |
| 28. ANS: C | STO: MI I.2.2, MI I.2.5, MI I.2.6, MI IV.2.5 |
| 29. ANS: C | STO: MI I.2.5, MI I.2.6, MI IV.2.5, MI IV.3.2 |
| 30. ANS: B | |
| 31. ANS: A | |
| 32. ANS: C | |
| 33. ANS: D | |
| 34. ANS: A | |
| 35. ANS: C | |
| 36. ANS: B | |
| 37. ANS: A | |
| 38. ANS: D | |

- 39. ANS: B
- 40. ANS: A
- 41. ANS: C
- 42. ANS: D
- 43. ANS: C
- 44. ANS: C
- 45. ANS: D
- 46. ANS: B
- 47. ANS: D
- 48. ANS: C
- 49. ANS: D
- 50. ANS: A
- 51. ANS: B
- 52. ANS: A
- 53. ANS: C
- 54. ANS: B
- 55. ANS: C
- 56. ANS: A
- 57. ANS: D
- 58. ANS: C
- 59. ANS: D
- 60. ANS: B
- 61. ANS: B
- 62. ANS: C
- 63. ANS: D
- 64. ANS: A
- 65. ANS: A
- 66. ANS: B
- 67. ANS: C
- 68. ANS: A